Paul D. Hagemeier
Vice President - Regulatory Compliance

December 9, 2011

VIA CERTIFIED MAIL #7010 1060 0000 0256 9036 AND EMAIL

Ms. Lisa Jackson
Administrator, U.S. Environmental Protection Agency
Ariel Rios Building
1200 Pennsylvania Avenue NW
Washington, DC 20460

Dr. Paul T. Anastas
Assistant Administrator
U.S. Environmental Protection Agency
Office of Research and Development
1200 Pennsylvania Avenue, NW
Washington, DC 20460

Dear Administrator Jackson and Dr. Anastas:

I write on behalf of Chesapeake Energy Corporation ("Chesapeake") in reply to your letter dated November 3, 2011, responding to our prior letter of October 25, 2011. Chesapeake remains committed to a positive working relationship with the U.S. Environmental Protection Agency ("EPA"), and to participation in the ongoing study on the relationship between hydraulic fracturing and drinking water resources (the "Study"). We are further committed to providing EPA with the support necessary to conduct the Study based on the best available science, in accordance with the Congressional request to EPA.

After review of your November 3 letter and the *Plan to Study the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources*, as issued in final form on November 3, 2011 (the "Final Study Plan"), Chesapeake remains concerned about many aspects of the methodology being used in EPA's Study and the Study activities EPA has engaged to date. Specifically, we do not believe EPA has not followed your own step-by-step protocols to ensure a study of this importance is conducted with good science, readily identified and achievable goals, a transparent and public peer review process, and appropriate quality assurances. In fact, Chesapeake is concerned the integrity of the Study may be impugned by this apparent disregard. Chesapeake's primary concerns are summarized below and detailed discussions of these points are attached.

- The Final Study Plan does not respond to many of the most critical comments of the Science Advisory Board.

Chesapeake Energy Corporation
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- EPA has been collecting samples and data for months under a draft study plan and without a Quality Management Plan, without the benefit of any of the documentation needed to guide and ensure the quality of the data.
- The Quality Assurance Project Plans for the five retrospective case study sites and other Study-related data collection and analyses recently became publicly-available on November 22, 2011 on EPA's website. The approval signature dates on these plans range from January 2011 to as recently as October 2011. These QAPPs were approved internally by your staff before EPA had finalized your own Final Study Plan and without a Quality Management Plan. The fact they are just now made available is incompatible with the Congressional request for a transparent and peer-reviewed process and appears to disregard EPA protocols for influential studies of this magnitude.
- The laboratories being used for the Study are not all accredited by the National Environmental Laboratory Accreditation Program or state environmental regulatory programs, an accreditation that EPA itself requires of the regulated community. Confidence in the resulting data (and any conclusions drawn from such data) will be eroded as a result. In fact, we are unable to find any commercial laboratory that is able to duplicate the analytical methods and procedures the EPA is using; limiting our ability to receive directly comparable results from our own sampling efforts.
- The inclusion of confidential sampling locations hinders the opportunity for peer review and undermines the transparency of the Study.
- EPA has expanded the scope of the Study beyond the Congressional request.

This work is too critical to the Nation to be completed in a manner that is anything less than scientifically sound, reproducible, comprehensive and transparent. I am certain you will agree with me on this point. Chesapeake remains committed to a positive working relationship with the EPA, and to participation in the Study. We appreciate the continuing efforts of you and your staff to develop and refine a transparent and scientifically sound process that can provide confidence in the data that is generated and any findings that are reached. I will ask John Satterfield, our Director – Environmental & Regulatory Affairs, to contact your staff this week in the hope that we may set up a meeting to discuss these important topics further.

Sincerely,

Paul Hageméier

PDH:rr

Enclosure

Detailed Discussion in Support of December 6, 2011, Reply Letter to EPA Letter of November 3, 2011

The Final Study Plan does not respond to many of the most critical comments of the Science Advisory Board

As noted in Chesapeake's October 25, 2011 letter, the Science Advisory Board ("SAB") provided the following comments on the Draft Study Plan:

> *"The SAB finds that the Study Plan provides inadequate detail on how to address the overall research questions presented in Table 2 (see Appendix B) and that the EPA should develop more focused research question that could be answered within the budget and time constraints of the project."*
>
> *"The SAB finds that the Study Plan provides limited detail on anticipated data acquisition, analysis, management, and storage (including model simulation results), and recommends that the EPA revise the draft Study Plan to include such details."*
>
> *"The SAB also finds that the Study Pan provides inadequate detail on how to address the overall research questions."*

The SAB's comments above clearly point out the flaws of EPA's methodology underlying the Study. Unfortunately, EPA did not address these comments nor provide an explanation for the lack of response in your September 27, 2011 response to SAB or in your November 3 letter to Chesapeake .[1] The fact that EPA did not provide sufficient detail in the Draft Study Plan, as identified by SAB, makes it difficult for us to share your interpretation that all field activities initiated before approval of the Final Study Plan "were explicitly described in the Draft Study Plan and supported by the SAB."

Additionally, it is not clear how or if the EPA met the SAB's expectations for detail in the Final Study Plan, given that the additions (approximately 50 pages) were not peer-reviewed by SAB or, based on available information, any other external group. These facts draw in to question EPA's adherence to OMB's *Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Information Disseminated by Federal Agencies* during the peer-review process.

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[1] In addition to the comments noted in Chesapeake's October 25 letter, SAB also provided the following statements, to which EPA has not responded:

> "*There was insufficient information to evaluate the likelihood of success from this research approach.*"
>
> "*The SAB concludes that the Study Plan provides limited detail on anticipated data analysis, management, and storage (including model simulation results), and recommends that the Study Plan include such details.*"

EPA has been collecting samples and data for months under a draft study plan and without a Quality Management Plan; without the benefit of any of the documentation needed to guide and ensure the quality of the data.

On November 14, 2011, EPA staff informed Chesapeake that due to the elevated quality standard required for this highly influential research, the Study requires implementation of a specific Quality Management Plan ("QMP"), and the associated Quality Assurance Project Plans ("QAPPs") have been developed based on this assumption. We also were informed, however, that the QMP has not been officially approved. EPA Requirements for a QMP mandate that "Quality systems supporting environmental programs involving environmental data or technology conducted by EPA organizations or by organizations funded by EPA shall be covered by an Agency-approved Quality Management Plan." The QMP must be approved and signed by the senior management of the organization. Simply put, a QMP is required by your own protocols and EPA has been conducting Study activities for months without having one in place.

Based on this information, we believe that the EPA has been operating outside of the Agency's protocol. To avoid potentially discrediting or compromising data obtained from the Study (or any conclusions drawn from such data), it would be prudent for the Office of Research and Development ("ORD") to investigate this matter and, if these facts are verified, for EPA to discontinue work on the Study until the necessary QMP approvals are obtained and this approved QMP is used to gauge the appropriateness of EPA's efforts to-date in regards to data collection, development of the existing QAPPs, the development of the Final Study Plan, and the peer-review process in general.

Given the imperative for EPA to consult with other Federal, State and interstate agencies, the use of Uniform Federal Policies for the QMP and QAPP seems most appropriate, particularly as the Agency strives for quality assurance in relation to the best available science.

The Quality Assurance Project Plans for the five retrospective case study sites and other Study-related data collection and analyses recently became publicly available on November 22, 2011 on EPA's website. The approval signature dates on these plans range from January 2011 to as recently as October 2011. These QAPPs were approved internally by your staff before EPA had finalized your own Final Study Plan and without a quality management Plan. The fact they are just now made available is incompatible with the Congressional request for a transparent and peer-reviewed process and appears to disregard EPA protocols for influential studies of this magnitude.

Your November 3, 2011 letter states that the QAPP for the retrospective study in Bradford County has been "completed and approved" and that EPA "will share a copy of the QAPP for the Bradford County site with Chesapeake in a timely manner." In fact, various QAPPs (including the plan for Bradford County) were posted on the EPA website, apparently on November 22, 2011.

The approval dates on the various QAPPs range from January to October of 2011. Given that many of the case studies and other Study-related data gathering detailed in these QAPPs have been underway for some time, the "timeliness" of releasing these documents to the public at the end of November is questionable. In fact, it appears that all of the currently available QAPPs were approved before the Final Study Plan was actually completed and published in early November 2011 and without the benefit of a QMP. The study-specific basis upon which these QAPPs were generated, reviewed, and approved was apparently the draft study plan – which, by its very definition, was neither complete nor finalized and subject to change before it was finally publicly published.

Chesapeake understands the need to make minor changes to the QAPP to accommodate findings during the initial phases of research. However, these changes should be bound by the overall scope of the Study and EPA should have identified anticipated scenarios that would require such changes. Given the current ambiguity in the scope of the Study, there is a risk that changes in the QAPPs could compromise the Study's quality, cost and schedule. These risks to the Study can be mitigated by strict adherence to EPA's Quality Policy and the requirements for QAPPs. All of these measures and processes would ordinarily be documented in the QMP.

You have noted that "updated QAPPs must be approved by quality assurance managers before the new work can begin." Although this QA manager is most likely an expert in his or her field, we find it difficult to understand how this individual will be able to make informed comments on content specific to hydraulic fracturing operations. To that end, it appears that EPA has not allowed for stakeholder engagement during the revision process, which might have provided EPA with the necessary review analysis of the QAPPs.

The laboratories being used in the Study are not all accredited by the National Environmental Laboratory Accreditation Program (NELAC) or state environmental regulatory programs, an accreditation that EPA itself requires of the regulated community. Confidence in the resulting data (and any conclusions drawn from such data) will be eroded as a result. In fact, we are unable to find any commercial laboratory that is able to duplicate the analytical methods and procedures the EPA is using; limiting our ability to receive directly comparable results from our own sampling efforts.

Your November 3 letter refers to the National Environmental Methods Index (NEMI) website (www.nemi.gov) in support of the proposition that EPA is "in fact, using publically available, peer reviewed methods for chemical analysis of critical analytes." This reference was queried by our staff, and none of the Robert S. Kerr Standard Operating Procedures ("RSKSOPs"), identified on the sample analysis plan provided to Chesapeake as the "analysis methods," were found.

EPA did provide some equivalent "EPA Methods" in the sample analysis plan which could be identified on the NEMI website; however, a number of the sample types were

identified as having "No EPA Method" in the sampling analysis plan or within the appropriate standard operating procedures ("SOP"). These include:

- Field Analytical
- Low molecular weight acids
- O, H stable isotopes of water
- $^{87}Sr/^{86}Sr$ analysis
- Glycols.

We are further concerned about the planned glycol analysis. According to the sampling analysis plan we received on October 12, 2011, the EPA Region III method is still "under development" and it is our understanding that the EPA Region III laboratory is not accredited for these analyses. With a stated holding time of 14 days this proposed glycol analysis, there is the potential that the method will not be developed in time to analyze the samples for the Bradford County, PA retrospective case study, and we fear this method was not finalized prior to utilizing it for other retrospective case study activities.

Chesapeake appreciates that EPA has prepared an SOP describing how EPA methods are implemented. However, as identified above, some of these sampling types do not have corresponding EPA methods and the SOPs do not appear to be following NELAC standards that are used by commercial laboratories to ensure the quality of data collected. One of many important aspects of the NELAC standard is the inclusion of a "methods modification" or equivalent section identifying if there have been any deviations from the promulgated EPA methods. This section was not identified during a review of the RSKSOPs. In addition, given the Congressional request and EPA commitment to the highest standard of quality, it is concerning that these SOPs have clearly not been through EPA's peer-review process or the ORD clearance process. Chesapeake's concerns echo those made by the SAB during their review of the Draft Study Plan: "O*verall the draft Study Plan inadequately describes the field and laboratory methods that will be utilized and thus provides insufficient information to allow full evaluation by the SAB.*"

Chesapeake appreciates that EPA has stated they are providing the opportunity for stakeholders to conduct concurrent, parallel studies. We believe this is directly aligned with the SAB's recommendation to "[p]rovide stakeholders with the timely and understandable information that they need to effectively participate in activities."[2] Nonetheless, we would like to reiterate our previously stated concern regarding the timeliness of the information that EPA has provided to Chesapeake, which has had a negative impact on our ability to participate in the study.

The inclusion of confidential sampling locations hinders the opportunity for peer review and undermines the transparency of the Study.

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[2] Draft EPA Scoping Document.

The inclusion of a confidential study location, as noted in your letter, is inconsistent with the transparency of the Study requested by Congress and obviously hinders stakeholders from conducting a concurrent, parallel study. While we appreciate your desire to honor landowners' requests to maintain privacy, EPA should have immediately rejected the concept of including confidential sample locations in the Study as contradictory of the Congressional request and prejudicing the credibility of the study.

EPA has expanded the scope of the Study beyond the Congressional request.

Congress requested EPA "to carry out a study on the relationship between *hydraulic fracturing* and drinking water." The following definitions of hydraulic fracturing have been provided by EPA and SAB in connection with the development of the study plan:

"Hydraulic fracturing (HF) is a well stimulation technique used by gas producers to explore and produce natural gas from sources such as coalbed methane and shale gas formations."[3]

"Hydraulic fracturing, which involves the pressurized injection of water, chemical additives, and proppants into geological formations, induces fractures in the formation that stimulate the flow of natural gas or oil, thus increasing the volume of gas or oil that can be recovered from coalbeds, shales, and tight sands."[4]

"Hydraulic fracturing: The process of using high pressure to pump fluid, often carrying proppants into subsurface rock formations in order to improve flow into a wellbore."[5]

These descriptions of the fracing process provide a clear and simple basis for the Study scope, focused on the relationship, if any, between hydraulic fracturing and drinking water resources. This focused, defined scope is consistent with SAB's recommendations:[6]

"The SAB recommends that ORD should emphasize human health and environmental concerns that are specific to or significantly influenced by hydraulic fracturing rather than concerns that are common to all oil and gas production activities."[1]

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[3] EPA-SAB-10-009 Science Advisory Board on EPA's Research Scoping Document Related to Hydraulic Fracturing (6/24/2011) http://yosemite.epa.gov/sab/sabproduct.nsf/0/CC09DE2B8B4755718525774D0044F929/$File/EPA-SAB-10-009-unsigned.pdf

[4] Fred S. Hauchman's, Director - EPA Office of Science Policy, Request for review of the Draft Plan to Study the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources. (2/9/2011) http://yosemite.epa.gov/sab/sabproduct.nsf/fedrgstr_activites/HFSP!OpenDocument&TableRow=2.3#2.

[5] EPA/600/R-11/122 Plan to Study the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources. (11/3/2011) http://water.epa.gov/type/groundwater/uic/class2/hydraulicfracturing/upload/hf_study_plan_110211_final_508.pdf

[6] Peer reviewers made similar recommendations. American Petroleum Institute, for instances, stated: "Consistent with the direction from Congress, the Study scope should be limited to studying the relationship between drinking water and hydraulic fracturing."

"The consensus of the Panel is that well drilling and cementing practices be researched separately from the hydraulic fracturing process itself. In doing so, the SAB finds the EPA can better focus on the question of the potential influence of the hydraulic fracturing process on drinking water resources and contamination of aquifers."[1]

The Final Study Plan, with its focus on the "hydraulic fracturing water lifecycle," is consistent with this approach. The "hydraulic fracturing water lifecycle" is described as the lifecycle "from water acquisition to wastewater treatment and disposal." This scope does not include the study of activities common to all oil and gas production but not directly related to hydraulic fracturing, such as drilling. In response to the SAB on September 27, 2011, Administrator Jackson confirmed this by stating that "well drilling practices *per se* are outside of the scope of this study."

The definition of "retrospective case studies" in the Final Study Plan is consistent with this approach:

> ***Retrospective case studies*** *will focus on investigating reported instances of drinking water resource contamination in areas where hydraulic fracturing has already occurred.*[7]

Despite this clear directive, a review of the Bradford County retrospective sample locations shows that EPA has selected a number of domestic water wells to be sampled in areas where hydraulic fracturing has never taken place. One location is more then two miles away from any hydraulic fracturing activity. Some of these areas have experienced natural gas *drilling*, but notably not *hydraulic fracturing*. The inclusion of these sites in the Study, despite the scope outlined in the Final Study Plan and in contrast to the statements by Administrator Jackson, shows that EPA has without authority expanded the scope of the Study beyond the Congressional mandate and its intended purpose.

Additionally, EPA has included in the Final Study Plan a number of statements that leave the scope of the study wide open for further expansion without identifying a protocol for peer-review, stakeholder engagement, and approval in this process. By way of example:

> *2.3 Research Prioritization*
> *As the research progresses, EPA may determine that modifying the research approach outlined in this study plan or conducting additional research within the overall scope of the plan is prudent in order to better answer the research questions. In that case, modifications to the activities that are currently planned may be necessary.*
>
> *13 Additional Research Needs*

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[7] Final Study Plan, p. ix (emphasis added).

> *Although EPA's current study focuses on potential impacts of hydraulic fracturing on drinking water resources, stakeholders have identified additional research areas related to hydraulic fracturing operations, as discussed below… If opportunities arise to address these concerns, EPA will include them in this current study as they apply to potential impacts of hydraulic fracturing on drinking water resources.*

These statements suggest that the EPA has and will continue to modify the research approach to conduct research *outside* the overall scope of the Study. In agreement with Congress, the SAB, and many other stakeholders, Chesapeake requests that the focus of the research be on, and limited to, the relationship, if any, between hydraulic fracturing and drinking water resources. Maintaining this focus will prevent further, unnecessary confusion, expenditures, and delays, and help to assure the collection of data useful to answer the pertinent question.

We support the inclusion of recommendations for future research in the 2012 and 2014 final reports that will be subject to peer-review, and would appreciate the opportunity to partner with the EPA on the evaluation and potential implementation of any such recommended research efforts.